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The MuM-PreDiCT project: fact-finding and awareness-raising on pregnancy and multimorbidity

AIMS Journal, 2025, Vol 37, No 4



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Women of reproductive age are increasingly living with two or more long term health conditions. This leads to a higher chance of complications for both mother and baby during pregnancy and birth and a heavier care burden for individuals, families and the NHS. There may also be long term consequences for both the baby and the mother's health conditions. However, there is also little research or clinical guidance on multimorbidity and the potential cumulative effects on maternity care, birth outcomes and future health.

The MuM-PreDiCT research project was set up to start to fill this gap. It has been a multi-disciplinary project, using both health datasets and interviews with women, families and health professionals, to begin to understand the implications for health and care and how best to respond to them at both an individual and system level.

We have also had an active parent advisory group, representing all four countries of the UK, a variety of long-term conditions, different ethnicities and families in both rural and urban locations. Members have

had a huge impact on the project, sharing their experiences and perspectives and helping shape analysis and conclusions, and some of them have contributed articles for this journal.

So far, we have found that around 20% of pregnant women have two or more long term health conditions, and that mental health conditions are highly prevalent in this group. The women were more likely to be older, have a BMI over 30 and to have smoked before conception. One of our studies used the Born in Bradford dataset and found differences in the occurrence of health conditions between White European and South Asian women, emphasising the need for culturally sensitive and targeted public health interventions. Women of South Asian heritage were more likely to develop diabetes, chronic liver disease, and thyroid disorders, and white women were more likely to develop cancer, common mental health disorders and neuromuscular conditions such as fibromyalgia. We also found an increased risk of preterm birth (6.7% in women with no long term health conditions, 11.6% in women with two or more conditions, and 15.6% in women with complex multimorbidity) although we could not determine whether these were spontaneous labours or planned preterm births. When we discussed this analysis before publication, our parent advisory group pointed out that, for women with health conditions and medications that were likely to cause problems for their baby's development in utero, a planned preterm birth would often be seen as a positive thing by parents as it would ensure all the necessary medical expertise was available.

We found that around 1 in 5 pregnant women are prescribed two or more medications in the first trimester. The impact of this on the unborn child is not well understood, as two of our researchers explain further in this journal, and expert advice on medication use in pregnancy is often not available. Maternal Medicine Networks were commissioned in 2021 in England in a bid to provide this expertise but provision and access varies widely.

Our interview study found that specialist maternity care is often fragmented, with women receiving conflicting advice from different specialists. We interviewed 57 women and 51 healthcare professionals, and key points included:

- Women with long-term health conditions and professionals recognised that it takes a team to avoid inconsistent care and communication, for example, medication management.
- Often, women were required to take a care navigation role to link up their healthcare providers.
- Women described mixed experiences regarding care for their multiple identities and the whole person.
- Postnatally, women and professionals recognised a downgrade in care, particularly for women's long-term health conditions.

- Some professionals detailed the importance of engaging with women's knowledge, and recognising their own professional boundaries of expertise.
- Many participants described difficulties in providing informational continuity and subsequent impacts on care. Specifically, the setup of care systems made it difficult for everyone to access necessary information, especially when care involved multiple sites.

We expect more papers to be published from the interview data, including one on pre-conception care which has recently been submitted. There are links to all our publications on the MuM-PreDiCT website, and this will be updated and maintained for at least another year.

We developed a core outcome set to help guide future research into pregnancy and multimorbidity by informing researchers what outcomes are important and should be measured as a minimum in all future studies. Use of this outcome set also enables better comparison of relevant studies. Researchers, parents and health professionals were all involved in developing the initial list and then narrowing it down to 11 outcomes, five for the mother (maternal death, severe maternal morbidity, change in existing long-term conditions [physical and mental], quality and experience of care and development of new mental health conditions) and six for the baby (survival of baby, gestational age at birth, neurodevelopmental conditions/impairment, quality of life, birth weight and separation of baby from mother for health care needs).

We also used the MuM-PreDiCT datasets to develop deep learning and Artificial Intelligence methods to study the long-term implications of pregnancy complications, leading to improvements to a model used to predict cardiovascular disease, and also to look at how certain conditions 'cluster' potentially leading to an increase in miscarriage. Our parent advisory group engaged in vigorous debate about this with researcher Christopher Yau. They generally felt that data that could contribute to preventative medicine was helpful, but also expressed concern that prediction models could limit their access to things such as health insurance. They pointed out that models such as this cannot predict the severity of a condition or its impact on everyday life, and that for some people they could create greater anxiety.

What has become increasingly clear to us is how much more work there is to do in this area. Team members are working on a proposal for funding to test a maternity care bundle for women with multimorbidity, which builds on some of our findings, and we are working with several charities and organisations in a bid to improve information for both parents and health professionals. Parent Advisory Group members have also raised questions that we were unable to address with the data available to us, such as the potential impact of over-the-counter medications (especially when combined with prescription medication), the interaction of multimorbidity with fertility problems and treatments, and the provision of information for transgender parents.

A huge thank you to everyone who has contributed to the MuM-PreDiCT project, including 4M Mentor

Mothers, LGBT Mummies, Yorkshire and the Humber Maternity City of Sanctuary, Mothers for Mothers, Maternal Mental Health Alliance, NCT and Starting Well in West Bromwich. Your experiences of maternity care have played a vital part in shaping this research and will hopefully lead to lasting improvements in care pathways.

Author Bio: Rachel is a mother of 3 adult sons, breastfeeding peer supporter, longstanding member of her local Maternity Voices Partnership and a former NCT antenatal teacher. She works with various universities, particularly Birmingham, Oxford and Nottingham, to ensure the views and experiences of women and families are reflected in health research.